

## Complete airway obstruction due to manufacturing defect of endotracheal tube connector

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### Keypoints

Airway obstruction occurring under general anaesthesia can prove to be a fatal event especially in the paediatric population. Manufacturing defects of the endotracheal tube when they do occur are a rare cause of airway obstruction. Therefore, a thorough inspection of the endotracheal tube should be performed before its use.

### Abstract

Manufacturing defects of endotracheal tube (ETT) are not so common but not so rare in anesthesia practice. The important thing is to identify these defects by careful examination of ETT prior to use. However, many defects remain unnoticed during routine inspection. This may lead to partial or complete airway obstruction of airway. Here we are reporting a case in which complete airway obstruction occurred due to manufacturing defect of prepacked single use (PVC) endotracheal tube connector which was promptly recognized and further complications were prevented. This case report highlights the importance of careful vigilant examination of ETTs before use to prevent any untoward events that can be life threatening to the patient.

**Keywords:** endotracheal tube, airway obstruction, defective ETT connector

### Introduction

Securing the airway with an endotracheal tube is an important part of general anaesthesia. Even after successful intubation sometimes it is not possible to ventilate the patients. This might be due to malfunction of the anesthesia delivery system, obstruction of the breathing circuit

and poor pulmonary compliance attributable to pneumothorax, bronchospasm, chest wall rigidity. [1] Rarely it might be due to manufacturing defects of ET tube which can cause obstruction while ventilating the patient as reported in many previous case reports.[1,2,3,4,5,6] Manufacturing errors of ET tube reported are defective connector.[1,4,5,6,7] or malformed cuff. [2,3] Such errors can be fatal if unnoticed and corrective steps are not instituted timely especially in paediatric patients. Therefore a preuse check of ET tube before intubation should be an integral part of anaesthesia practice, despite this some defects may remain unnoticed.

We are reporting a case of total airway obstruction due to completely occluded endotracheal tube connector with zero patency which was missed in routine inspection prior to use. Our objective of presenting this case is to emphasize that careful examination of entire ETT including patency of lumen and cuffs is necessary prior to intubation to prevent any catastrophe.

### Case report

An 8 month old child (wt 8 kg) of ASA grade 1 was taken up for inguinal herniotomy under general anesthesia

sia. Preanesthetic assessment of patient was unremarkable. Patient was already cannulated with 24 gauge cannula in ward and we started an infusion of Isolyte P. We received patient in crying condition. Patient was premedicated with Inj. Glycopyrrolate 0.04mg, Inj. Midazolam 0.4 mg, and Inj. Fenatnyl 16ug intravenously. Routine monitoring with noninvasive blood pressure, pulse oximetry and ECG were applied. Patient was preoxygenated for 3 minutes then induction was done with Inj. Propofol 25 mg IV and Inj. Succinylcholine 15 mg IV. Patient was ventilated by bag and mask with Jackson Rees circuit and then intubation was done with prepacked portex uncuffed endotracheal tube no 4 and ETT was fixed at no 10 mark at the level of incisor and connected to Jackson Rees circuit. When ventilation was attempted, we were unable to ventilate the patient. There was no air entry on chest auscultation. Marking was checked at the level of incisor to rule out endobronchial intubation. It was same as fixed previously. Manipulation of tube was done to rectify the possibility of impingement of tip of the ETT on tracheal wall. But oxygen saturation started to decrease and dropped to 85%. The patient was immediately extubated and ventilated with bag mask successfully resulting in improvement of saturation to 100%. The patient was then reintubated with a new prepacked portex uncuffed ETT no 4 by same manufacturer. Once again, it was not possible to ventilate the patient. The patient was extubated and ventilated by bag mask with Jackson Rees circuit successfully.

This created a doubt about a defect in ETT. A thorough examination of ETT regarding patency was done. We found that the connector of both tubes was completely occluded with zero patency as shown in figure 1. The connector of the ETT was replaced with a patent connector from a previously used tube and patient was reintubated after which successful ventilation was achieved. Surgical procedure was accomplished without any complication with smooth recovery of patient. When other ETTs by same manufacturer were checked, they were also completely occluded as shown in figure 2. Hospital

purchasing committee was informed and all the defective ETTs were sent to the committee.



**Figure 1,2.** The connector of tubes are completely occluded

### Discussion and conclusion

After successful intubation if there is a difficult in ventilating the patient, certain conditions may be associated like acute bronchospasm, tension pneumothorax, endobronchial mass lesion, poor pulmonary compliance, kinking of ETT, defects of ETT and anaesthesia delivery malfunction.<sup>1</sup>

Various manufacturing defects of ETT are reported which make ventilation difficult like herniation of ETT cuff [2], intraluminal tracheal obstruction [3], elliptical defects in the wall of tube causing air leak [4], kinking of endotracheal tube [5] and intraluminal plastic films and meniscus. [6,7]

Baldemir et al [1], Jain et al [8], Sofi et al [7] also reported the cases in which there were difficulty in ventila-

tion due to manufacturing defect in ETT connector [1] and due to plastic meniscus at the distal end. [7]

In all these cases obstruction was partial or incomplete and defect was limited to a single ETT.

In contrast in our case complete airway obstruction occurred because the ETT connector was completely occluded with zero patency. Moreover this defect was observed not only in single tube but the entire batch of ETT of size 4.

In present case other possible causes of airway obstruction like acute bronchospasm, pneumothorax, chest wall rigidity due to fentanyl etc. were excluded because we were able to ventilate the patient with bag and mask. It drew our attention entirely on ETT.

On careful examination we found that the connector of ETT was completely occluded with zero patency.

In conclusion we suggest that a thorough careful examination of all components of the the ETT including the connector, tube, cuff and pilot balloon should be done. In case of an unanticipated difficulty in ventilation in an intubated patient, if all other causes have been excluded, the probability of mechanical obstruction of endotracheal tube should be ruled out.

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